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ABSTRACT

The document presents Module 4, applications of theories of creativity to the gifted/talented, of the Star Power modules developed for school personnel who have an interest in or a need to explore the area of gifted and talented education. It is explained in an introductory section that the modules can be used for independent study, for small group interaction, or for a large group inservice program. Part I focuses on J. Guilford's Structure of Intellect model, while Part II covers contributors to understanding creativity (including E. Torrance, A. Osborn, W. Gordon, and F. Williams). Each part is divided into sections with the following: enabling objectives (such as apply Guilford's model to specific activities in your teaching area and describe several procedures for cultivating creativity in gifted/talented students); rationale to establish a frame of reference; preassessment tests and evaluation; instructions for scoring the preassessment instrument; activities (which cover such topics as discussing implications of the Structure of Intellect model for career counseling and making a list of books and resources which can be used to stimulate creativity); and postassessment procedures. (SBH)

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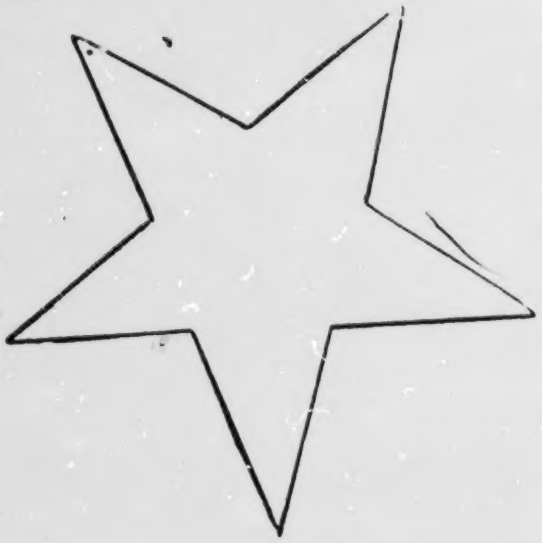

star power

providing for the gifted & talented

MODULE 4

APPLICATIONS OF THEORIES OF CREATIVITY TO THE GIFTED/TALENTED

by

Alison Heinemann and Jackie Mallis

EDUCATION SERVICE CENTER, REGION XIII

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1977

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We would be remiss if we did not also recognize here the splendid contributions of more than 35 mothers in the Richardson area, members of different parent associations for the gifted and talented, who also participated in the field testing.

PROCEDURE

The modular approach to professional growth is an alternative to attending workshops and institutes which may be inconveniently located and to taking college courses which may be scheduled at times that are awkward for the individual. The modules can be used for independent study, for small group interaction, or for a large group in-service program. They have been designed to serve as a minicourse, an introduction to the study of gifted child education.

The following is a step-by-step description of the proper procedure.

1. Read the goals and objectives thoughtfully so that you know what is expected of you by completion of the module.

2. Read the rationale to establish a frame of reference.

3. Try the preassessment and compare your responses with those given in the preassessment evaluation.

4. Score your responses IF YOU WISH; then determine whether you will complete those activities specified in the section headed "Entry Level" or whether you will select the activities you feel you need.

5. Proceed to work with the activities identified.

6. Try the postassessment to find out how successful you were in attaining the established objectives.

7. Compare your responses with those given in the postassessment.

8. Decide whether you will recycle as directed, proceed to another module, or invest your time and energy in something else.

The other modules in the STAR POWER series are listed on the inside back cover.

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A LOOK AT CREATIVITY

"To give a fair chance to potential creativity is a matter of life and death for any society. This is all important, because the outstanding creative ability of a fairly small percentage of the population is mankind's ultimate capital asset."

- Arnold Toynbee

GUILFORD'S

STRUCTURE OF INTELLECT MODEL

GOAL: *To understand the various parts and interactions of Guilford's Structure of Intellect in order to apply this model to activities for the gifted/talented.*

I. Enabling Objectives

After completing this part of the module, you will be able to

1. Describe Guilford's model, including the interaction of sub-components.

2. Apply Guilford's model to specific activities in your teaching area.

II. Rationale

The works of Piaget, Bloom, Harrow, and others did not settle the question, "What is intelligence?"

The nature of intelligence continued to intrigue psychologists, including J.P. Guilford and his associates at the University of Southern California. They believed that previous efforts like the taxonomies failed to describe adequately such mental operations as comprehension and evaluation. Within these there seemed to be many smaller units of intellectual activity. Consequently, Guilford devised a model called Structure of Intellect, which demonstrates specific ways the mind functions and includes creative thinking.

Understanding Guilford's three-dimensional model requires thoughtful practice to keep the various terms straight and to be able to manipulate the many three-part combinations which represent different mental activities.

However, the effort is well worth making, for this model offers a systematic approach to devising activities and questions which will develop or improve specific mental abilities. In addition, the model suggests a new way to identify the many types of giftedness.

III. Preassessment

PLEASE DO NOT WRITE IN THE MODULE.

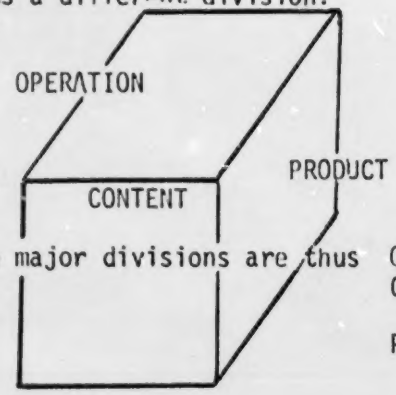
1. List the three major divisions of Guilford's model.
2. Name each of the sub-components of these divisions.
3. Show with examples how at least 3 sets of sub-components interact to represent specific mental functions and explain what each set means.
4. Describe at least three such interactions applied to the classroom.

Turn to the next pages and compare your responses.

GT # 4

PREASSESSMENT EVALUATION

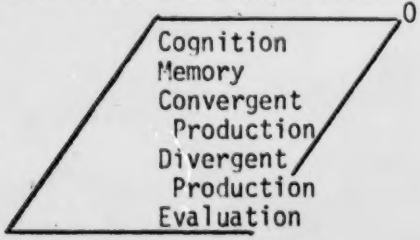
1. The Guilford model is a three-sided cube. Each surface - or plane - represents a different division:



The three major divisions are thus
OPERATION - what the mind does
CONTENT - what the mind does [this] to
PRODUCT - how the mind organizes the information

2. Each division has several sub-components as illustrated below:

O P E R A T I O N



Cognition is the combination of being exposed to knowledge and understanding it.

Memory is, obviously, the storage and later use of the information.

Convergent Production is the process of working with the information in order to provide a specific "correct" or expected answer.

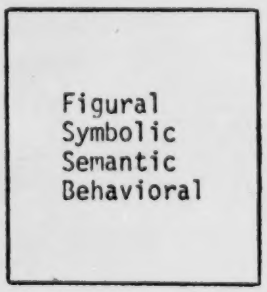
Divergent Production, on the other hand, is a more creative involvement with the generation of a quantity and variety of responses.

Evaluation requires judgments based on specific criteria.

C O N T E N T

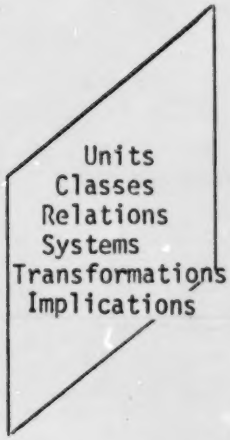
Figural: Concrete images (shapes) which can be perceived with the senses

Symbolic: Also shapes, including letters, numbers, objects, musical notations, codes, and other signs, but these now represent something meaningful.



Semantic: Words and the meanings of those words in context

Behavioral: Actions, including gestures, facial expressions, and other kinds of body language. (Not all of the abilities involving this type of content have yet been identified.)



P R O D U C T

Units refer to separate, single items of information: one dog, a letter, the word, a musical sign, one number, a shape...

Classes are sets of items that are the same or have a common property or attribute: two dogs, three letters, six words, several numbers or objects...

Relations are units or classes which have some kind of connection: a chair and a desk, for example; a pitcher and four glasses on a tray; a person with a dog on a leash...

Systems combine units or classes for a purpose, such as a particular variety of tools needed for a carpentry project; a series of musical notes creating a pattern of sound...

Transformations change existing elements in some way. The pattern of musical notes may, for example, be reversed, or the notes may remain the same but a new tempo changes them from quarter to eighth notes and a "rest" may be added to create a different rhythm...

Implications involve predictions, anticipation of consequences, extrapolations of information. In this numerical progression, the information which should follow the pattern established can be predicted: 1 4 7 10 *(13)* *(16)* *(19)*.
Analogies also require anticipation or prediction: *hat* is to *head* as *shoe* is to _____.
big is to *little* as *love* is to _____.

3. Each sub-componert for one division can interact with any of the sub-components of the other two divisions. EXAMPLES:

Cognition/Figural/Units	Knowledge and understanding of a single shape
Memory/Symbolic/Classes	Recall of two or more symbols or signs
Convergent Production/Semantic/ Relations	Giving a predetermined response about the connection of given words
Divergent Production/Semantic/ Systems	Providing a number of different verbal answers - words - to open-ended questions or using a variety of sentences in a composition
Evaluation/Behavioral/Trans-formations	Judging modifications of one or more actions according to an established criterion
Cognition/Behavioral/Implications	Knowledge of and understanding consequences of certain actions

4. *Answers will vary. Judge the suitability of your response according to whether you have the correct interpretation of the different divisions and sub-components.*

SAMPLE INTERACTIONS AS THEY CAN BE APPLIED TO THE CLASSROOM:

Cognition/Figural/Units -	Students are learning to recognize the names of different objects in the classroom, such as a chalkboard, a pencil sharpener, the teacher's desk... in a second language.
Memory/Symbolic/Classes	Tapping elements of the Morse code
Convergent Production/ Semantic/Relations	Listing the names of the capital cities of selected states
Divergent Production/ Semantic/Systems	Constructing a haiku or cinquain (poem)
Evaluation/Behavioral/ Transformations	Judging the effectiveness of improvisations in a series of charades
Cognition/Behavioral/ Implications	Watching a large football team begin to play with a small football team

If you prefer, proceed directly to Activities and complete one or more as needed. Otherwise, score your responses according to the following guide.

SCORING

Item 1: Allow 2 points for each correct answer.

Item 2: Allow 2 points for each correct name of the 5 sub-components of Operation; the 4 of Content; the 6 of Product.

Item 3: Allow 3 points for each correct combination of sub-components.

Allow 3 points for each meaningful explanation of sets given. Judge by samples presented.

Item 4: Allow 5 points for each interaction of three sub-components applied to classroom activities. (Judge by samples presented and by definitions of the various sub-components given.)

Entry Level

Mastery is represented by a total of 48 points. If your combined score on all items equals or exceeds 48, omit the rest of this section and proceed to the next part, CONTRIBUTORS TO UNDERSTANDING CREATIVITY.

If your score is less than 48 points, complete as many of the Activities that follow as you need.

IV. Activities

1. View the sound filmstrip (cassette tape), MENTAL BLOCKS: Guilford's Structure of Intellect Model (in the kit). Notice the various combinations of sub-components and the ways they can be related to activities for different age groups.

   When you finish the filmstrip, use Part 2 of the Worksheet accompanying the filmstrip to plan similar activities for your gifted/talented students, identifying the sub-components represented.

2. With your gifted/talented students, try appropriate exercises from one or more of these S.O.I. workbooks:

   CONVERGENT PRODUCTION

   DIVERGENT PRODUCTION

   EVALUATION - Advanced

   (All are in the kit.)

3. COUNSELORS or TEACHERS: Administer the S.O.I. Learning Abilities Test (in the kit) to a sample of at least 10 pupils (or an entire class if you prefer).

   Discuss test results with colleagues in terms of what the test reveals about mental functioning. Evaluate the S.O.I. approach as a diagnostic tool for identifying individual strengths and weaknesses among the different mental functions, for identifying giftedness.

4. COUNSELORS or TEACHERS: With other counselors or faculty present, discuss the implications of the S.O.I. model for career counseling. For example, what particular abilities does the test indicate for specific students? Which careers require these abilities?

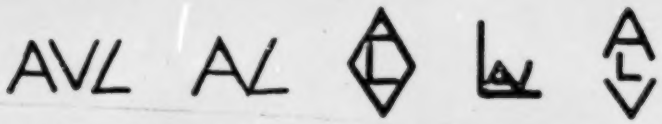
5. Below and on the next page sample problems appear that test some S.O.I. abilities. For each problem, identify the three-part combination of elements being tested. (Refer to the information on pages 4 and 5 as needed to refresh your memory of the sub-components of Operation, Content, and Product.)

PLEASE DO NOT WRITE IN THE MODULE.

a. Monograms. Construct different monogram designs from three given letters.

Sample given letters: AVL

Possible responses:



b. Commonsense Judgment. Select the two best of five given methods to demonstrate the truth of a given statement.

Given statement: The light in an electric refrigerator goes out the moment the door is closed.

Given methods:

A. Feel whether the bulb is hot after the refrigerator door has been closed for some time.

B. Substitute a wire-socket arrangement leading to a bulb outside the refrigerator.

C. Utilize a delayed-shutter camera that would expose a film after the door is closed.

D. Disconnect all appliances except the refrigerator, close the door, then see whether the electric meter is running.

Answers: B and C

c. Missing Links. Produce three words to complete a chain of associations.

Sample items:

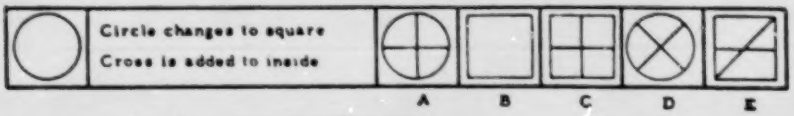
1. work _____ _____ _____ orange

2. red _____ _____ _____ beer

Possible completions: 1. job money food
2. sunset weather cold

d. Prescribed Relations. Choose one of five figures that bears a described relation to another figure.

Sample item:



Answer: C

e. Missing Pictures. Choose one of three photographed situations to complete a story, making the best psychological sense.

Sample item:

Answer: 3. *(Samples from Guilford, 1971)*

Turn the page and compare your responses.

KEY TO S.O.I. Abilities

a. *Divergent Production/Figural/Systems*

From given information - the three letters - the student was to construct DIFFERENT monogram designs. Five responses, two of them rather unusual, were possible. Actually, a student with strong creative potential might be able to generate even more.

b. *Evaluation of Semantic Implications*

The key word best is a clue here to an evaluative kind of response. A judgment must be made with the selection of TWO methods. In order to be able to do this, semantic elements (words) must be examined and with them, their implications.

c. *Divergent Production of Semantic Systems*

This task involves relating information given to a variety of possible associations. Individuals with different experiences would be likely to react with completely different associations.

d. *Convergent Production of Figural Transformations*

The ability to visualize how a given figure will appear when the prescribed changes have been made is a matter of comprehending what is happening to the original shape as the changes (transformations) are made. The keyword here is "another" - one expected answer.

e. *Evaluation of Behavioral Implications*

According to the pictures, the young man wearing glasses did not reach the fallen item soon enough. His expression in the third picture suggests that he has evaluated the situation and his belated response with dissatisfaction.

6. Evaluate the usefulness of the S.O.I. approach for

   * identifying specific areas of giftedness and talent
   * emphasizing non-academic areas of giftedness
   * designing individualized instruction
   * stimulating creative and productive thinking.

7. An Exemplary Title III Project based on Guilford's model was developed for Grades 1 through 3 at East Whittier City School District, California. This was a systematic attempt to expand the children's divergent modes of thinking. Two approaches were used: divergent modes for all students in the regular classroom; convergent modes with small groups of students as a control. The project students at all grade levels exceeded the performance of the control group in fluency, flexibility, originality, and elaboration. S.O.I. profiles and tasks were used.

   With one or more colleagues try to replicate this approach to learning, using the appropriate S.O.I. materials. Those teachers with control groups emphasizing convergent thinking might use the divergent thinking materials the second six weeks or so while the teachers of the experimental groups work with the convergent production materials. Results can be compared and reported to the rest of the staff. (IF you wish additional information, write to Mrs. Eleanor Manning, East Whittier City School District, East Whittier, California.)

V. Postassessment

PLEASE DO NOT WRITE IN THE MODULE.

1. Describe J.P. Guilford's S.O.I. model. Include a definition of each of the three basic dimensions of the model as well as the different sub-components.
2. Combine five sets of sub-components and explain or describe each of five activities which you can use with your gifted/talented group.

Turn to the next page and compare your responses.

GT # 4

POSTASSESSMENT EVALUATION

1. Refer again to pages 4-6 in the module.
2. Refer to pages 3-12 in the module, to activities presented in the sound filmstrip, MENTAL BLOCKS, and/or to activities in the S.O.I. workbooks.

Review Objectives 1 and 2 on page 1 and rate yourself on a 1 to 5 (high) basis according to your candid opinion of the degree to which you have achieved each objective.

For example: 5 = very well, could not be improved

3 = average, fair, some knowledge and understanding demonstrated

1 = poor, need much improvement

If you score 3 or lower on either objective, recycle through the appropriate activities; then try the necessary part(s) of the Postassessment again.

CONTRIBUTORS TO UNDERSTANDING CREATIVITY

GOALS: *To understand the creative process and to discover the contributions of various individuals in the area of creativity as these relate to classroom activities.*

I. Enabling Objectives

After completing this part of the module, you will be able to

1. Define creativity or describe the creative process.
2. List at least 3 ways creativity can be measured.
3. Describe the contributions of Guilford, Williams, Torrance, Osborn, and Gordon to our understanding of creativity.
4. Name 5 blocks to creativity.
5. Describe several procedures for cultivating creativity among gifted/talented students.

II. Rationale

"The creative energies of gifted children need to be activated and guided early, or else they can be lost - or prove dangerous," Dr. E. Paul Torrance has stated. He added, "In most classrooms, the child who expresses an unusual idea or offers an unusual production takes a calculated risk! In such a setting, it takes a great deal of courage for a child to press for presentation of his unusual ideas. Such ideas are frequently hooted or depreciated as 'silly' or 'screwy'."

In general, creativity has not been highly regarded in our schools past the primary grades. As content becomes more important, the mastering of facts assumes undue emphasis. "Factual information is essentially sterile if left in its raw state," Frank E. Williams claims. "Imparting independent pieces of unrelated information lacks relevance to children."

Discouraging creativity - or simply not encouraging it - can lead to intellectual and emotional bankruptcy; yet when a group of teachers were asked for ways to STAMP OUT creativity, they responded without hesitation. Figuring out ways to promote creativity took longer.

During the '60s, knowledge was doubling every five years. Now the same thing is happening EVERY TWO MONTHS! What children in Grades 4, 5, and 6 learn may be obsolete by the time they enter high school. What freshmen in high school learn may be obsolete by the time they graduate. Technology's advances have overturned much "knowledge," information formerly believed to be accurate. Social and political revolution have made a mockery of much "knowledge" that generations of students acquired about

the African continent and other parts of the world.

Knowledge fades rapidly. Creativity, encouraged and developed, exists for a lifetime barring accidents or illnesses affecting the mind. We seem to have our priorities askew when we force-feed facts and fail to stimulate creative interaction with or from those facts.

III. Preassessment

PLEASE DO NOT WRITE IN THE MODULE.

1. Define *creativity*.
2. List three ways creativity can be measured.
3. How did J.P. Guilford, E. Paul Torrance, Alex F. Osborn, William J.J. Gordon, and Frank E. Williams contribute to a better understanding of creativity?
4. State at least three factors which hinder or block creativity.
5. Describe at least three ways creativity can be encouraged and developed in the classroom.

Turn to the next pages and compare your responses.

GT # 4

PREASSESSMENT EVALUATION

1. *Your answers will vary, but you should have included the underlined words or their equivalents in meaning.*

   Barron (1969) has given this simple, clear definition:

   "Creativity may be defined as the ability to bring something new into existence... Since human beings are not able to make something out of nothing, the human act of creation always involves a reshaping of given materials, whether physical or mental. The 'something new' is a form made by the reconstitution of, or regeneration from, something old."

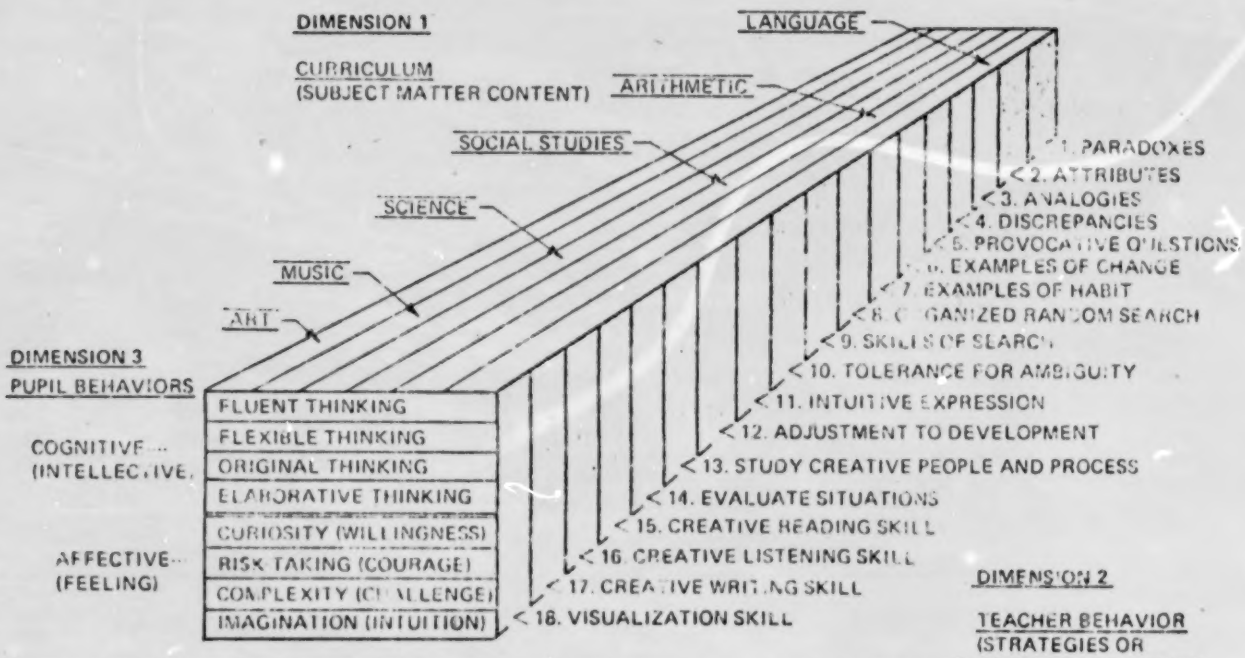
   Joe Khatena (1973) offers a definition of more recent vintage: "the power of the imagination to break from perceptual set so as to restructure ideas, thoughts, and feelings into novel and meaningful associative bonds." (For the creative process, see Number 5, p. 22+.)

2. Creativity can be measured by four different types of instruments, including
   * rating scales
   * observation checklists
   * creativity tests
   * biographical inventories.

   Mary Meeker's *Rating Scale for Identifying Creative Potential* (see Appendix A in the module, p.41) lists distinctive traits of creative individuals. In his *TOTAL CREATIVITY PROGRAM*, Frank E. Williams provides various observational checklists for identifying different thinking and feeling behaviors related to creativity. E. Paul Torrance's *TESTS OF CREATIVE THINKING* involve words and pictures, while *THINKING CREATIVELY WITH SOUNDS AND WORDS* (co-authored by Joe Khatena)

requires increasingly creative associational responses to recorded stimulus sounds and stimulus words. (Both tests are in the kit.) The *Alpha Biographical Inventory* (levels 9-12) is reportedly highly reliable in identifying creativity in a variety of areas: music, dramatics, art, literature (fiction, poetry), dance, leadership, and academic subjects. A significant feature of all of these instruments for measuring creativity seems to be lack of racial bias.

3. J.P. Guilford: The Divergent Thinking sub-component of Guilford's Structure of Intellect model relates to creative production of ideas. Frank E. Williams was stimulated by the S.O.I. model to evolve a three-dimensional model of creativity. As the diagram shows, the first dimension is CURRICULUM, which interacts with the second dimension - TEACHER BEHAVIOR - and with the third, PUPIL BEHAVIORS.



(From CLASSROOM IDEAS FOR THINKING AND FEELING, by Frank E. Williams. D.O.K. Publishers, 1970. p.ii.)

Williams' model offers the novice and the teacher experienced in thinking creatively some departure points for providing activities to develop creativity in the classroom.

E. Paul Torrance has been an active and seemingly tireless student of the creative process for many years. Besides his involvement in the tests previously mentioned, he has published numerous professional articles and books, including the following well-known titles: *GUIDING CREATIVE TALENT, EDUCATION AND THE CREATIVE POTENTIAL, REWARDING CREATIVE BEHAVIOR, ENCOURAGING CREATIVITY IN THE CLASSROOM, GIFTED CHILDREN IN THE CLASSROOM,* and a Phi Delta Kappa "Fastback" pamphlet - in cooperation with his wife - *Is Creativity Teachable?*

Alex F. Osborn's book, *APPLIED IMAGINATION*, is a readable overview of the many efforts put forth to teach creativity. It is a textbook for the Creative Problem-Solving classes and institutes at the State University of New York/Buffalo. (Every summer the Creative Education Foundation sponsors creative problem-solving institutes open to educators, professionals in other areas, representatives of business and industry, and other interested persons. These are productive sessions under the leadership of Dr. Sidney J. Parnes.) Osborn's book includes such chapters as "Ways by Which Creativity Can Be Developed," "The Basis of Idea-Finding," "Detailed Procedures of Group Brainstorming," and "Devices to Help Activate Idea Production."

William J.J. Gordon has developed a theory called Synectics according to which creativity is stimulated through making associations or comparisons. In *Making It Strange*, ordinary everyday objects or common

concepts are combined in unusual ways to challenge new ways of thinking about things or subjects we take for granted. For example: What color is loneliness? Which is happier - a rug or a refrigerator? How are a pain and a pickle alike? To the non-creative, such questions may seem silly and unproductive. Actually, they stimulate students to looking at the familiar in new ways and encourage creative responses.

4. Blocks to creativity: *ANY 3 or their equivalents*

   An environment hostile to original thinking
   An authoritarian teacher who still believes teaching is "pouring knowledge into little ears"
   Ridicule of ideas that are "different"
   Insistence on conformity, success-oriented behavior
   Too much emphasis on the "proper" expected sex roles of young people
   Beliefs that non-conformity and divergent thinking or behavior are abnormal
   Beliefs that the child who wants to be alone or who prefers to work alone is maladjusted
   Beliefs that being creative is synonymous with undisciplined actions or mental functioning
   Beliefs that there is no time to be concerned with a student's creativity in the classroom because of an already overcrowded curriculum

5. Creativity in the classroom can be encouraged and developed in a number of ways: *ANY 3 (or similar activities)*

   a. Provide an environment of warm acceptance of ideas, inviting both richness and depth, and allow TIME for the stages through which a person proceeds in the creative process as described by Wallas: (1) *Preparation* (a time of investigating a subject, looking at it from various angles, of gathering information)
   (2) *Incubation* (a seemingly quiet, nothing-happening period during which much is going on internally as the individual mulls over his/her observations, ideas, information - sifting, organizing, shaping...)
   (3) *Illumination* (the "Aha!" or "Eureka!" experience when the creator suddenly discovers where he/she is going - the idea, concept, solution - and proceeds with full speed ahead)
   (4) *Verification* (an analytical, more objective stage

of critical reviewing, testing, revising...).
NOTE: Both the *incubation* and *illumination* stages seem to involve DIVERGENT THINKING. These are the two stages, Gallagher points out, which are likely to be ignored, or at least neglected, in the classroom.

b. Use different kinds of creative thinking exercises to "prime the pump," setting minds to probing experiences, feelings...

c. Use games like charades and/or puzzles that challenge the imagination.

d. Have students decipher codes or create original codes and challenge other students to decipher these.

e. Encourage handicrafts that require originating designs, creating from odd bits of "treasured junk."

f. Stimulate activities derived from or based on reading: letter-writing, writing of gag lines for cartoons from which the original lines have been removed, writing of commercials...

g. Hold synonym-hunting "bees," with teams competing to think up as many synonyms as possible for a given word.

(All of these ideas are from Osborn's *APPLIED IMAGINATION*. The words he suggested for the synonym hunt were *superficial* and *acumen*.)

h. Pose questions like

WHAT WOULD HAPPEN IF
we could not see colors?
we kept getting smaller each day instead of bigger?
children lived in central children's centers instead of with their parents, visiting parents in the home on specified occasions?

HOW WOULD YOU FEEL IF
everyone were a geometric figure: a square, rectangle, circle, triangle, octagon, parallelogram...?
everyone looked alike?

HOW WOULD YOU IMPROVE A ---? (Name an object, product, etc., appropriate for the interests of your students.)

WHAT COULD YOU MAKE WITH ---? (List the items - as varied as possible in type, quality, texture, color, size, weight, etc.)

i. Provide a variety of print and non-print materials to stimulate new ideas; e.g., *Amazing Mazes*, *Line Designs* (both in the kit).

j. Offer opportunities to explore a variety of situations, places, topics...

k. Prepare examinations which require the use of information in new ways that call forth creative thinking.

EXAMPLE: *For a vocabulary test - instead of the usual matching of word and definition or synonym plus use of the word in a sentence - one teacher presented the class with a list of "associations" to which the students had to match the appropriate word. Sample associations and words included the following:*

1. *A clown*	a. *execute*
2. *Winner of a pie-eating contest*	b. *ripple*
	c. *droll*
3. *Hanging*	d. *scale (verb)*
4. *A flag in the wind*	e. *glutton*
5. *Mountain climbing*	

The first time this was done the class was so taken by surprise the results could not be used. The teacher let this be an exercise instead to accustom the students to the idea.

EXAMPLE: *A fifth-grade teacher closed a unit on pioneering times with a test that called for the students to list what they would take with them to the West if they lived in the early 1800s. "Grading" was based on whether they could survive without help from others with the items listed. This kind of test required careful thinking rather than a parroting of memorized facts.*

If you prefer, proceed directly to Activities and complete as many as needed. Otherwise, score your responses according to the guide on the next page.

SCORING

Item 1: Allow 2 points for a clear-cut definition of creativity if it includes the idea that creativity involves producing something new/different by recombining existing elements in new, possibly unusual, ways.
If you described the creative process, you should have included elements pointed out by Wallas (Number 5, pp. 22+).

Item 2: Allow 2 points for each type of measuring device listed.

Item 3: Allow 3 points for each person whose contributions you could specify (nature, titles, and/or concepts).

Item 4: Allow 2 points for each block to creativity mentioned. (Besides those listed, you might have rigid curriculum, acceptance of only one answer, one source (teacher or text) as valid, refusal to allow discussions and evaluative statements among students...)

Item 5: Allow 5 points for each procedure described which encourages and develops creativity in the classroom.

Entry Level

Mastery is represented by a total score of 41 or better, including minimum scores. If your score equals or exceeds 41, you need not continue with this module.

Item 1: *If you scored less than the full two points on*
Item 2: *the first item and less than 5 on the second, you need a deeper understanding of what creativity is. Complete Activities 1-6, pp. 26+.*

Item 3: *If you did not score at least 13, you lack familiarity with individuals currently active in the field. Complete Activities 1, 2, 8, 9, 17.*

Item 4: *Unless you scored 8, you need to increase your awareness of factors conducive to developing creativity. Complete Activities 7, 11, 13, 14.*

Item 5: *If you scored less than 13, you seem to lack ideas. Complete Activities 3 or 4 (These can be exercises as well as tests.), pp. 26, 27, 15-24, pp. 29-32.*

IV. Activities

1. Examine the *Torrance Tests of Creative Thinking* (in the kit). Administer the tests to the students with whom you work. Score each test section as described.

   Evaluate the effectiveness of the tests as a device for measuring creativity: ease of administration, amount of time required, exactness with which it enabled you to separate the highly creative from those with low creativity... Include any problems, difficulties, special advantages, etc. Present your findings to other colleagues, perhaps at a staff meeting.

2. Compare *Thinking Creatively with Sounds and Words* with the *Torrance Tests of Creative Thinking*. (Both are in the kit.) Consider what is being tested, how each test is administered and scored, what kinds of results each yields. Select one and administer it to at least 3 students; later administer the other one to the same students. To what degree did the results correlate and reinforce each other? Share your findings with the students involved and with your colleagues.

3. Show your students the film, *Boomsville* (in the kit), without explanation the first time. Then tell them they will write a narrative, poem, or journal entry based on the film. Rewind and show the film again. (It may be necessary to have even a third showing; the film is short and moves rapidly.)

   Evaluate the results with regard to evidences of high and low creativ-

ity. (Poetry and prose evaluations in Appendix A may be used as a guide.)

4. Have your students provide the "story" for THE SILVER PONY (in the kit), matching description, narration, dialog, or explanation to the appropriate pages.

   Evaluate the results with regard to evidences of high and low creativity. (You may want to refer to the evaluations in Appendix A as a guide.)

5. Mary Meeker's informal rating scale has helpful descriptions and explanations to assist educators in using her "Rating Scale for Identifying Creative Potential" - in the kit.

   While students are involved in self-directed activities, observe at least 5 and rate them according to the Meeker system.

6. Select from Williams' CLASSROOM IDEAS FOR THINKING AND FEELING (in the kit) appropriate exercises to try with your students. Note which ones are especially successful and share with a colleague.

7. Try MAKING IT STRANGE - 1, 2, or 4 (in the kit) with your students. Notice to what extent unexpected associations stimulate creative responses.

   Encourage students to combine their own associations in similar fashion for others to respond to.

8. LIBRARIANS: Make a list of books and other resources available in your library or from the Education Service Center which can be used to stimulate creative thinking and production (e.g., picture books without narration for upper level students to write AND RECORD for

pre-school or kindergarten children).

9. Read Strang's material, "How Can Creativity Be Developed?" (Appendix B in the module). Plan specific ways you can apply each of the italicized suggestions. Include lists of materials needed. Create appropriate exercises, activities, or tests. Then use these plans with your students. Observe student reactions and revise your plans so that they will be more effective. Or develop variations and try them.
10. Read "Leading Out and Letting Be," by Elizabeth Monroe Drews (Appendix C). What is Drews' philosophy of educating the gifted/talented? What are the most important qualifications for a teacher of gifted/talented students to have according to her?

    Relate this article to your own work with gifted/talented students. How have you inspired and "released" students with exceptional abilities? Name several students you are now working with, needs you have identified, and ways you can help these students fulfill their potential. Plan to begin as soon as possible to try out the ways stated.
11. COUNSELORS or TEACHERS: Read the article from Psychology Today, "What Makes Creative People Different?" (Appendix D) and relate it to what you know about biofeedback, transcendental meditation, alpha rhythms, and right brain versus left brain specialization.

    LIBRARIANS: Read the same article; then prepare and distribute a bibliography of pertinent readings to staff members.

    OR

    Present a review of this article to a group of colleagues or to the staff. (If the subject interests you, you may also be willing to re-

search and report on possible physiological bases for sex differences in intelligence and creativity.)

12. Examine the topics listed under "Care of the Creative - Gifted" (Appendix E). Select one and brainstorm with colleagues to come up with useful suggestions you can apply in working with your creative students.

13. Travel and first-hand experiences stimulate creativity. List several places you can take a group of creative students to provide both travel and first-hand experiences different from what the students have previously been exposed to. For example, a dump; a stables (if students have never been to one); a marina; a plant nursery; a forest with tall, thick-set trees...

    After the trip have the students express their reactions in some manner - paintings, music, dance, writing, etc.

14. Encourage students who indicate fluency, flexibility, original thinking, elaborative thinking to enter contests appropriate for their talents. The University of Texas (Austin) Interscholastic League (UIL) schedules contests in dramatics, debate, poetry and prose interpretation, informative and persuasive speaking, ready writing (expository) on one of three assigned topics, journalism, picture memory (of specific paintings, the artists, and the nationality of the artists), number sense, science, slide rule, shorthand, typewriting, music, and athletics. A copy of the Constitution and Contest Rules of the University Interscholastic League is in the kit. This book describes the different kinds of contests in addition to specifying the regu-

lations. It also lists a number of scholarships available to the League's literary and academic contestants. (An updated edition should be purchased if participation is considered.)

The Texas Forensic Association and National Forensic League sponsor activities in debate, duet acting, oration, humorous and dramatic interpretation, extemporaneous speaking...

Scholastic Magazine offers art, photography, and writing contests annually. Rule books should be requested between October and January from Scholastic Awards, 50 West 44th St., New York 10036, specifying the division of interest.

Seventeen Magazine searches for promising young writers. Participating in contests enables gifted/talented students to measure their abilities against those from other districts, regions, states.

15. "Creativity thrives on reading," says Alex F. Osborn and recommends biographies as the most rewarding. Select a variety of biographies about little known individuals who have contributed something worthwhile or experienced the unexpected. (Do encourage your librarian to assist with this.) Have interested students read the biographies of their choice and compare two or more individuals.

    Suggest sharing information with a student-made filmstrip, slide/tape presentation, transparencies, or other method of communication other than an unadorned "oral report."

16. Have students brainstorm ways to improve the class or the school. Follow the proper procedures for brainstorming:

    * Emphasis on quantity (quantity begets quality)

* Deferment of judgment (no criticism of suggestions)

* "Piggybacking" - riding on another's ideas, elaborating, using them as springboards for new ideas

* Setting of deadline (e.g., 20 minutes) or quotas (at least 25 ideas, for example)

If needed, use questions to spur ideas: What if...?
What else...?
How else...?
Why not...?

17. Institute a creative problem-solving session to discuss problems of interest/concern to the students:

* Set time aside for fact-finding.

  Have the problem defined with a wide focus, then clarified in writing with a narrow focus on a segment of the big problem.

  Have all pertinent data about the problem gathered and analyzed: the how's and why's, causes, related/contributory factors...

* Establish a time for idea-finding.

  This is often the weakest, most neglected area. Have students study the problem from every angle, using associations and guided by checklists to pile up as many ideas as possible:

Adapt?	Modify?	Substitute?	Maximize?
Omit?	Divide?	Minimize?	Rearrange?
Reverse?		Combine?	

* Finally, have students evaluate their solutions by looking at the solutions and objectively rating them.

Possible problems, depending on maturity of students and interests:

* Should I join Little League? Boy Scouts?
* How can I become a more contributing member of our class (school, community)?
* How can I overcome my shyness? Temper? Fear of -- ?
* How can we raise money to finance a summer trip to a

study session in (Guadalajara, Alaska, France...)?
* Should I go to college? Which college?
* Should I start my own business?
* How can we improve our community?

18. Read "Is Creativity Teachable?" - in the kit. Try a program such as the Torrances conducted.

19. Read Chapter 7 in Torrance's GIFTED CHILDREN IN THE CLASSROOM, pp. 59-70, "Helping Gifted Children Become Creative Writers" (in the kit). Apply suggestions to your gifted students.

20. Read CREATIVE READING FOR GIFTED LEARNERS: A Design for Excellence, pp. 51-58 or 60-68. Apply suggestions to your gifted students.

21. Have gifted/talented students complete exercises of their choice in DIVERGENT THINKING (in the kit) to develop fluency, flexibility, original thinking, and elaborative thinking.

22. Use material in LIFE INTO LANGUAGE (in the kit) to stimulate creative responses.

IV. Postassessment

PLEASE DO NOT WRITE IN THE MODULE.

1. Define *creativity*.
2. Give the *titles* of 3 published instruments used to measure creative thinking and production.
3. Compare the contributions of Torrance, Osborn, and Gordon to a better understanding of creativity.
4. Describe Williams' creativity model, naming the dimensions and at least 4 sub-components of each dimension. Explain how it derived from Guilford's Structure of Intellect model.
5. List 5 blocks to creativity and explain how they can be overcome.
6. Describe at least 5 different ways to help students develop and/or increase their creativity.

Turn to the next pages and compare your responses.

GT # 4

POSTASSESSMENT EVALUATION.

1. Answers will vary, but the underlined words or equivalents should be included.

   Creativity is the ability to produce something new or different by combining existing ideas or materials usually generated by others in new ways.

2. Published instruments to measure creativity: *ANY 3*

   a. *Torrance Tests of Creative Thinking*

   b. *Thinking Creatively with Sounds and Words*

   c. *Rating Scale for Identifying Creative Potential*

   d. *Alpha Biographical Inventory*

   e. *S.O.I. Learning Abilities Test - Divergent Production parts*

3. Torrance: design of creativity tests
   research in the field of creativity
   articles and books, including
   REWARDING CREATIVE BEHAVIOR
   GUIDING CREATIVE TALENT
   EDUCATION AND THE CREATIVE POTENTIAL
   ENCOURAGING CREATIVITY IN THE CLASSROOM
   GIFTED CHILDREN IN THE CLASSROOM
   Is Creativity Teachable?

   Osborn: *APPLIED IMAGINATION* - an overview of many developments in the field of creativity (and textbook for the Creative Problem-Solving Institute, Buffalo, N.Y.)

   Gordon: theory of "Synectics": looking at things in new ways to gain fresh insights by making the strange familiar (relating it to what we know) and making the familiar strange, using analogies and associations to force thinking out of established pathways and molds

4. Williams' three-dimensional model of creativity was derived from the Divergent Production component of Guilford's Structure of Intellect model.

4. (continued)

Williams' model shows how teachers can use attributes, paradoxes, analogies, provocative questions, and other strategies in any of the 6 basic curriculum areas to elicit such pupil behaviors as fluent thinking, flexible thinking, original thinking, elaborative thinking, risk-taking, and others.

His book, *CLASSROOM IDEAS FOR THINKING AND FEELING*, presents specific activities corresponding to elements in his model.

5. Creativity is blocked by: *ANY 5*

A hostile environment	(Provide a more accepting environment, welcoming students' ideas, letting students try new activities, explore new interests)
Coercion to perform	(Encourage but do not "hassle" a student to engage in an activity which may in some way be threatening to the student)
Fear of failure	(Call students' attention to the fact that failure is a learning experience, that scientists, inventors, artists, composers, performers, writers, and other creative individuals often fail many times to achieve what they intend but learn from each failure)
Envy of the success of others	(Show students how to succeed in their own special areas or how to accomplish something lacking: a skill, for example)
Greed - lack of satisfaction with one's gains	(Frequently this is an indication of a multi-talented student who is drawn to a number and variety of areas and feels insufficient in any; try to determine if this is the problem and encourage a period of emphasis on single areas until a desired outcome has occurred; if overly ambitious parents are the problem, have a personal conference with them, possibly with the counselor included.)

Grief caused by a personal problem	(Express quiet concern and desire to help; if no response, let the student be until he/she can let go of the sorrow.)
Vanity - conceit because of one's own superiority	(Compliment the student when accomplishment warrants; however, also arrange for student to work with other students who are even more gifted in the same area or areas.)
Adversity - challenges too great for the student's level	(Because of their giftedness, the gifted/talented are frequently asked to assume responsibilities for which the students are not yet prepared; they often encourage adversity by their very enthusiasm when confronted with a challenge. Try to gauge when students are undertaking too much or activities which are beyond their present skills, strength, endurance...)
Rigid curriculum	(Pre-test for mastery of required skills; then free the students who show mastery to work on topics or projects of special interest while the rest of the class completes the work assigned.)
Acceptance of only one answer	(Be alert to the fact that textbooks may be out of date, have misprints, may omit information or have errors; realize that test-makers and teachers are NOT infallible: they make mistakes, too.)
Refusal to allow discussions and evaluative statements among students	(Reconsider the basic aims of education, one of them being to teach students to think. Instead of fearing their behavior if they are encouraged to think for themselves, teach them HOW TO THINK and let other students keep track of faulty thinking patterns. Let go of your belief that the only way students learn is to read or listen to you. Admit when you are wrong or don't know and encourage mutual search for correct answers when such are possible. With interpretations, insist that students

support their interpretations with specifics.)

6. WAYS to help students develop/increase creative thinking and productivity: *ANY 5*

See pages 22-24, Number 5; also Activities pages 27-32.

Review the objectives listed on page 15, and rate yourself on a 1 to 5 (high) scale according to your candid opinion of the degree to which you have achieved each objective.

For example: 5 = very well, could not be improved

3 = average, fair demonstration of understanding and knowledge

1 = poor, need much improvement

If you score 3 or lower on any objective, recycle through the appropriate activities; then try the necessary parts of the Postassessment again.

GT # 4

Resources

PART ONE

Sound Filmstrip

MENTAL BLOCKS: Guilford's Structure of Intellect Model. Jackie Mallis and Alison Heinemann. Austin, TX: Region XIII Education Service Center. 1977.

Test

S.O.I. LEARNING ABILITIES TEST. Mary Meeker, Larry Mestyanek, Robert Meeker. El Segundo, CA: S.O.I. Institute. 1975.

Workbooks

CONVERGENT PRODUCTION. Mary Meeker and Valerie Maxwell. 1970, 1975.
DIVERGENT PRODUCTION. Mary Meeker. 1973.
EVALUATION - Advanced. Mary Meeker. 1970, 1973, 1976.
El Segundo, CA: S.O.I. Institute

PART TWO

Activity Books

AMAZING MAZES. Rick and Glory Brightfield. N.Y.: Harper Colophon Books. 1973.

LINE DESIGNS. Dale Seymour, Linda Silvey, and Joyce Snider. Palo Alto,CA: Creative Publications, Inc. 1974.

Articles

"Leading Out and Letting Be." Elizabeth Monroe Drews. Today's Education. January-February, 1976.

"What Makes Creative People Different?" Colin Martindale. Psychology Today. July, 1975. pp. 44-50.

GT # 4

Books

CLASSROOM IDEAS FOR THINKING AND FEELING. Frank E. Williams. Buffalo, NY: D.O.K. Publishers, Inc. 1970.

CONSTITUTION AND CONTEST RULES OF THE UNIVERSITY INTERSCHOLASTIC LEAGUE. Austin, TX: The University of Texas at Austin. 1977-78.

CREATIVE READING FOR GIFTED LEARNERS: A Design for Excellence. Michael Labuda, ed. Newark, DE: International Reading Association. 1974.

GIFTED CHILDREN IN THE CLASSROOM. E. Paul Torrance. NY: The Macmillan Company. 1965.

Is Creativity Teachable? E. Paul Torrance and J. Pansy Torrance. Bloomington, IN: Phi Delta Kappa Educational Foundation. 1973.

LIFE INTO LANGUAGE. Eric W. Johnson. Bantam Books, Inc. 1976.

MAKING IT STRANGE - 1, 2, 4. Synectics, Inc. NY: Harper & Row, Publishers. 1968.

THE SILVER PONY. Lynd Ward. Boston, MA: Houghton Mifflin Company. 1973.

Excerpt

"How Can Creativity Be Developed?" Ruth Strang. CREATIVITY OF GIFTED AND TALENTED CHILDREN. NY: Bureau of Publications, Teachers College, Columbia University.

Film

Boomsville. NY: Learning Corporation of America.

Rating Scale

A Rating Scale for Identifying Creative Potential. Mary Meeker. El Segundo, CA: S.O.I. Institute.

Tests

Thinking Creatively with Sounds and Words. E. Paul Torrance and Joe Khatena, 1973.

Torrance Tests of Creative Thinking. E. Paul Torrance. 1966. Lexington, MA: Personnel Press/Ginn and Company.

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Barron, F. CREATIVE PERSON AND CREATIVE PROCESS. N.Y.: Holt, 1969.

Gordon, William J. SYNECTICS. N.Y.: Harper & Row, 1961.

Guilford, J.P. and Ralph Hoepfner. THE ANALYSIS OF INTELLIGENCE. N.Y.: McGraw-Hill, 1971.

Khatena, Joe and E. Paul Torrance. MANUAL: THINKING CREATIVELY WITH SOUNDS AND WORDS. Lexington, MA: Personnel Press/Ginn and Company, 1973.

Osborn, Alex F. APPLIED IMAGINATION. N.Y.: Scribner, 1963.

Wallas, G. THE ART OF THOUGHT. N.Y.: Harcourt, 1926.